
Space Weather Forecast

Issued on Monday, 27 November 2023 at 13:19 Local

This forecast provides a four day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales <https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales>

Space Weather Forecast Headline: Chance of isolated M-class flares. Chance of G1-G2 Minor/Moderate storms with Coronal Mass Ejection arrival late day 3/early day 4 (29-30 Nov)

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Low, with only common class flares observed. There are eleven sunspot regions on the visible disc. The largest flare was observed from the lead and also a decaying member of the group of three sunspot regions in the northwest disc. These regions are looking increasingly simple, with the first two unipolar, while the rearmost one is a bipolar but also smaller. The largest region on the disc is in the southeast, consisting of a compact collection of dark spot cores. The trailer spot of this group does share some of its area with an opposite magnetic polarity regions, but despite this remains magnetically simple and largely inactive. All other regions persist as either smaller or mature sunspot groups.

There are a number of filaments on the Earth-facing disc. These are lines of plasma held together by the Sun's magnetic field, and can erupt to produce coronal mass ejections (CMEs). One such eruption occurred at around 27/0535 UTC and produced a CME which is still under analysis, however a preliminary assessment suggests an Earth-directed component with arrival either late day 3 or early day 4 (29-30 Nov).

Solar Wind / Geomagnetic Activity: Solar wind speeds declined from elevated to be slightly elevated, 550 km/s to 450km/s. Interplanetary Magnetic Field (IMF), was weak, with north-south component also weak and variable in direction. Geomagnetic activity was Quiet (Kp 0-2).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) persisted at background with no solar radiation storms occurring.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be Low to Moderate, with a chance of isolated M-flares. These most likely if any further development occurs, especially with the larger spot on the southeast disc.

Solar Winds / Geomagnetic Activity: There are potentially two Earth-directed CMEs. The first is low confidence, from 24 Nov, perhaps giving a slight glancing impact later on day 1 (27 Nov). The second is still under analysis, originating from the broad filament eruption off the southwest disc earlier on 27 Nov. A preliminary assessment suggests arrival late on day 3 or early day 4 (29-30 Nov). Otherwise current slightly elevated winds are expected to gradual ease with no other enhancements indicated. Quiet geomagnetic activity is expected, with isolated Unsettled spells day 1-2 (27-28 Nov). Active to G1 Minor Storms intervals possible from any CME glance day 1 (27 Nov). Active to G1 Minor Storms are likely, with a slight chance for G2 Moderate storm intervals from any impact from the second CME, late day 3 or early day 4 (29-30 Nov). Activity easing later day 4 (30 Nov).

Energetic Particles / Solar Radiation: The count rate of energetic particles (high energy protons) is likely to stay at background, but there is the potential for an increase to be observed

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if any large flares or filament eruptions occur. This brings a slight chance of approaching, and perhaps exceeding, the S1 Minor Radiation Storm levels.

Geomagnetic Storms:

Geo-Magnetic Storm	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Minor or Moderate	G1 to G2	No	10	1	20	40
Strong	G3	No	1	1	5	5
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	45	45	45	45
Very Active	R3 to R5 X	No	5	5	5	5

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm ⁻² sr ⁻¹ s ⁻¹)	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	5	10	10	10
Very Active	≥ S3 *	No	1	1	1	1

* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = cm⁻²sr⁻¹s⁻¹)